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ART. I. — THE GREAT MIDDLE REGION OF THE UNITED STATES, AND ITS LIMITED SPACE OF ARABLE LAND.

OF the value and capabilities of the great middle country between the Mississippi Valley and California much is said and little is known. If we are guided by our early school-atlases, we have an arid desert over the whole area. If we take as authority the published statements of corporations and individuals now possessing large interests in that section, we have one uninterrupted field of fruitfulness, capable of producing States like Pennsylvania, Illinois, and Missouri. In either case we should be far from right, but the truth is somewhere between these extremes.

It would not be strange if, upon investigation, it were found that the popular estimate of this region is somewhat too high; for there is not an interest of any kind, nor the wish of one individual, that so immense a country, as large as thirty-seven States, should be a valueless waste. On the contrary, forty millions of people hope and expect it will give homes to as many families, and add proportionately to our riches and greatness. At the same time, the interests of railroad companies that it should be considered valuable land, are measured exactly by the number of millions of dollars for which it can be hypothecated. These interests have perceptibly acted upon the mind of the nation, and the fact has not yet dawned upon the people

that the western limit of our agricultural lands has already been reached by settlements along the frontier, from the Rio Grande to the 49th parallel of latitude.

There can be no fairer way to get at the general character of all this interior country than by accurate statistical data, and by traversing the entire distance to the Pacific Ocean at intervals of a few degrees. Then, if the traveller judges intelligently what he sees, and describes truthfully, his conclusions should be entitled to some consideration; above all, if his motives are to arrive at truth. Suppose a start is made from the general line along the eastern boundary of Texas, the Indian Territory, Kansas, Nebraska, and Dakota, commencing with the southernmost line, — say nearly along the 32d parallel of north latitude, — passing through Texas, New Mexico, and Arizona. This parallel nearly bisects the State of Texas, but the western portion of our southern boundary deflects so much northward as to make it necessary for our route to deflect also. In going westward through Texas, whether we start from the Sabine, from Galveston, or from Powder Horn, we find, until we reach the meridian of San Antonio, or about the 98th degree west from Greenwich, a region of plains and timber, well watered, a moist atmosphere, and a sufficient rainfall, making a valuable agricultural country. For a hundred miles farther, or, in fact, until we come to the 100th meridian, all these features rapidly change, the soil becomes thin, the rainfall less; the streams dry up in summer, timber is more meagre, the grass shorter, and changes into *mesquite*, or buffalo-grass, and the surface becomes broken. The climate varies most singularly in different years. Two or three successive seasons of drought will be followed by as many of abundant rains. Nothing can surpass the fruitfulness and beauty of this section in seasons of plenty, — which has given rise to much beautiful but partial description, — nor its desolation in drought. In the third successive dry season the grass actually disappears altogether, and the earth cracks open in immense fissures. Great difficulty is then found in subsisting stock, and much actually perishes. The annular layers of the timber show this change of seasons to be the regular order there. In going beyond

the 100th meridian we pass at once into a dry, broken, and barren country, with very little timber, except thorny bushes, and, from lack of moisture, unfit for agriculture, excepting along the narrow margins of streams that can be irrigated. Continuing westward through the southern portion of the State till we reach the Rio Grande at El Paso, we find a few springs, and but one stream, the Pecos, that is not liable to go dry in summer; and even the Pecos is not available for irrigation, its waters being alkaline. The surface of Western Texas is covered scatteringly with bunch-grass, and some other varieties of grass, cactus, and some thorny shrubs. In the more northern portion of the State, on leaving the 100th meridian, we at once strike the foot-hills of the Staked Plains, which are high table-lands, altogether sterile, extending to the river Pecos in New Mexico. Out of these foot-hills spring numerous small streams, the sources of the Red, Brazos, and Colorado Rivers; nearly all these branches having narrow strips of good land which become broader and better timbered as the streams flow east. Blodget says of this section: "On the upper plains of Texas, and over all the plains west of the 100th degree of longitude, irrigation is generally necessary to support cultivation which requires the summer for its growth" (page 745 of Report). All Western Texas, except the Staked Plains, is broken up with chains and spurs of rugged, barren hills and mountains, often terminating in high table-lands covered with scant grass, but neither timber nor water, except in holes where the rains have collected. The sides of some of the high mountains are fringed with pine timber. This same general character of country extends across New Mexico, except that the mountains are more regular, and there are a few fertile valleys of very limited extent. In Arizona it becomes still more mountainous, barren, and arid, but, in the extreme southern portion, adjoining Sonora, there is a strip, some fifty miles in breadth, of considerable fertility, in which Fort Buchanan is situated, and where the rainfall is sufficient for limited agriculture without irrigation. This territory of two or three hundred miles in the western part is less mountainous, and has broader plains, but is without permanent water, except in very few places, and is generally

so sterile that the travelled routes meander with the larger streams like the Gila, which, with a large number of smaller streams that rise in the great central chain of mountains and empty into the Colorado, has a narrow valley of varying breadth from a few yards to two miles, which can be irrigated, and all the remaining agricultural lands of Arizona are of this character. All these streams are gradually absorbed in the sands as soon as they leave the mountains, and most of them add but little water to the Colorado. Going westward, we cross this stream (which we find has a narrow valley, liable to be overflowed by the swift and changing current), and find ourselves in California, where for a hundred miles, or until we cross the range of mountains about twenty miles from the sea, there is a worthless, sterile plain, like that east of the Colorado. The last twenty miles of this route are moderately good, but very uncertain as agricultural country.

Again, taking a course along the general direction of the 35th parallel, which nearly bisects the Indian Territory, New Mexico, and Arizona, and crosses the southern portion of California, we find the eastern half of the Indian Territory, or that portion east of the meridian running through Fort Arbuckle, to be well watered, with a reasonable amount of timber, a rich and productive soil, a varying surface, and many ranges of hills; about one half of the land is suitable for agriculture, and many of the river-bottoms are of great richness. Farther west there are strips of scanty soil, less rainfall, and, after travelling seventy miles, the land susceptible of cultivation is confined to the valleys of the small streams. Going still farther, there is less and less good soil, until it disappears altogether on reaching the vicinity of the 100th meridian. In the northern portion of the Territory this aridity is sooner reached than in the southern part, where there are some very rich valleys, similar to those of Northern Texas before reaching the Staked Plains. The western half of the Indian Territory is too dry and barren to till, and continues so, with some few exceptions, until we reach the Rio Grande in New Mexico. On the river Pecos, at Fort Sumner, where the Navajo Indians were carried and kept for several years, the water of that stream was tried for irrigating pur-

poses; but although the Indians are very industrious, and are irrigating farmers at home, they failed here, on account of the strongly alkaline water of this stream. Farther south, round about Fort Stanton, there is a good deal of very fine and picturesque country. The Rio Grande runs through this Territory from north to south, a turbulent, rushing torrent. It has, for its whole length, a valley varying in width from a few yards to three miles, and where these broad valleys are found there is some farming by irrigation, and here and there are situated Mexican towns. The western part of the Territory comprises the land occupied by the Navajo and Zuna Indians; it is mountainous, with a few deep gorges, where the seprimitive people carry on a simple farming and sheep-growing quite successfully.

The lands of any value whatever in this entire Territory are very limited, the estimate of the Surveyor-General (see his Reports of 1867, 1868, and 1869) being that not more than one million acres, or about one acre in seventy, in the whole Territory, are capable of even this style of agriculture. Going west, we cross a high, very broken, and mountainous country, covered with a growth of gramma and bunch-grass, but with very little land that can be tilled; and in Arizona, instead of any improvement, the mountains become higher, with higher table-lands, between more and more broken ravines, of great depth, and much country covered with volcanic deposits, and of entire sterility. Yet there are many large areas in Arizona covered with forests of various trees, sometimes widening into handsome parks. The mountains in these sections are covered with pine, the plateaus with juniper, the borders of the streams with cottonwood, and the valleys with grease-bush and sage. But so very desolate is a large portion of this Territory, that it is destitute of game. The mountains are less rugged as we go south, and afford many grassy spurs suitable for grazing.

Prescott, an American settlement near the centre of the Territory, is situated in a region where, from its position in the mountains, the natural rainfall permits some agriculture, but dependence is placed upon irrigation. The Gila, the Colorado near Fort Mahone, and some smaller streams, have valleys that can be irrigated, and are cultivated in some few spots, there being as many as ten thousand acres in a body devoted

to the raising of corn and barley ; but by the most liberal calculations of the Surveyor-General and others there is not more than one acre in sixty or one hundred that can by any possibility be cultivated. Westward, through California, to the Pacific, the mountains become more rugged, precipitous, and barren. Lieutenant Wheeler, of the Engineer Corps of the Army, says in his Report : "The greater portion of the area examined in Southern California was of the most barren and desolate nature ; the bare and brown rocks seldom being relieved by any sort of vegetation." There is, however, along the entire coast some land that can be cultivated.

The third route, nearly on the 39th parallel, follows the Kansas Pacific Railroad, so far as it goes, and this portion is pretty well known. This parallel nearly bisects Kansas, Colorado, Utah, Nevada, and California. The eastern half of Kansas, or rather until we reach the neighborhood of the 98th meridian, about Fort Harker, has an excellent soil, and, although occasionally subject to drought, has generally a sufficient rainfall, a fair amount of timber, and abundant crops. But at this meridian a very perceptible change takes place. The altitude grows greater, steadily, as we go west, the soil becomes more and more arid, the native grasses shorter, the streams less frequent, and, after passing Fort Hays, we get beyond the country suitable for agriculture. This section, extending west nearly to Denver, is that known as "The Plains." It is a succession of gentle undulations, without timber, and covered with buffalo-grass, which is a short native grass, seldom growing more than two inches high. It is very nutritious, almost the exclusive food of the buffalo ; maturing in June, it is dry and brown the remainder of the year.

Sometimes in the period of a single day, when the wind sweeps eastward from the great western altitudes and constantly grows more dense, it becomes so hot as to be a perfect sirocco, and the green slopes of the morning are by evening withered and burned to a dull brown. When the grass is green these plains present the most beautiful appearance, and impress one with their great likeness to an unlimited pasture of great fertility ; and, to fully appreciate the transformation, one must see the rapid change from green to brown. For the

years 1861 and 1862 the Kansas Pacific Railroad Company employed a farmer to experiment on their lands; but the moisture of the spring season has heretofore been of too short duration for him to accomplish much, and there is comparatively little water for purposes of irrigation. I have his official Report before me. His grains failed, except on "some stalks of moderate length." Some grasses failed, with successes for other varieties. Many kinds of trees failed, others succeeded. Those reported a success were varieties of little value, like the catalpa, box-elder, and honey-locust. But to my directions to correspondents on the line of the road within the last few weeks, "Count and report the number of trees alive, planted more than two years," the answer is, "None living." His general results are what can be attained anywhere on the plains by careful experiments, in tolerable seasons. They will not answer for the farmer.

At military posts gardens have, only by irrigation, been made possible. The Arkansas runs through the State, and the Solomon, Republican, and Saline Rivers rise in the northern part of it, in numerous small branches, giving some narrow strips for irrigation; but as a rule the soil is unsusceptible of agriculture and unfit for settlement. Denver City is situated near the eastern foot-hills of the Rocky Mountains, in which rise the rivers Platte, Arkansas, Red, Rio Grande, and one branch of the Colorado, and the prosperity of that city is purely the outgrowth of the mining interests of that region, which support a small agricultural industry by irrigation.

The western half of the Territory of Colorado is broken and mountainous. The snows of winter, when they melt, form a great number of small streams, which all afford limited facilities for irrigation. There are many thousand acres of the finest land so situated on the streams which form the Arkansas, and there are many small areas in the valleys of the mountains, where the rainfall is sufficient to obviate the necessity of irrigation. The grazing is excellent in many parts of this Territory, the mountains afford a great amount of timber, and there are besides several fine parks within its borders. In its southwest corner, and in the contiguous angles of New Mexico, Arizona, and Utah, there is a large area which is nearly

a *terra incognita*; there being no definite and accurate account of it. According to the estimate of the Surveyor-General, there are in Colorado, including the strip cut off for Wyoming, from two to four million acres of arable land (but he says he thinks the smaller number nearest the fact); that is, somewhere from one fifteenth to one thirtieth of the whole area. My own observations are confirmatory of this calculation; and yet so vague are the opinions of the mass of the people on this point, that I have been told within the past few days by a high official of this Territory, in reply to the question, what was the proportion of available land in Colorado, "that one half could be cultivated."

The following is taken from the records of the Commissioner of the General Land Office at Washington: "I (the Surveyor-General of the Territories of New Mexico, Arizona, and Colorado) estimate the arable lands of New Mexico at one million acres, and of Arizona at about the same." "The term 'arable' is synonymous with 'irrigable.'" He says further: "Those Territories may be divided into mountains, table-lands, and valleys. The valleys can be irrigated, but they form but the small portion above given. The table-lands are too high to admit the water to be carried on to them, but are covered with grass, and form about three fourths of the country. The remainder is mountains."

Again going west, we pass over a high, broken, and mountainous country, covered mainly with wild sage, till we cross the Wahsatch Mountains in Utah, where, at the western foot, there is a thin line of Mormon settlements, using the water coming down from the mountains for irrigation. The remainder of this Territory and Nevada, until we reach the eastern foot of the Sierra Nevadas, is composed of parallel ranges of mountains from fifteen to twenty miles apart, all running north and south, and having sandy, desert valleys between. The Wahsatch range is fringed with pine; the ranges west are covered with short cedar and piñon, a sort of scrub pine, and the ranges farthest west are destitute of timber. All of the mountain slopes and some of the valleys bear grass thinly, and sage-brush and grease-bush. After leaving the Mormon settlements, with the exception of a few oases, a narrow strip at

the eastern foot of the Humboldt Mountain, on Deep Creek, and a few other mere patches, none of this country can be cultivated. The whole amount of available land in Utah is so very small as to scarcely admit of comparison. So little is there, that the Mormon authorities are already compelled to seek land in the adjoining Territories for their new arrivals of emigrants. The eastern foot of the Sierra affords fine timber and excellent land, but in limited quantities. As we proceed into the mountains and cross them, there is abundant and excellent timber, but only the merest patches of available land, until we reach the Sacramento Valley in California, which is from ten to thirty miles in width. From there to the sea it is a mountainous country, with many fine, but very narrow valleys. The same is true of this coast section, both north and south. About one third of the western half of the State is available, while not more than a twentieth of the eastern part can be used by any of the processes of farming which will be used in America for a hundred years to come.

Passing rapidly, now, over the route of the 41st parallel, beginning at Omaha, we find for the first two hundred miles, or to Fort Kearney, one of the most beautiful portions of the continent. The Platte and Elkhorn valleys cannot be surpassed in richness by any soil in the world, and greatly resemble the Rhine Valley. A great number of small streams water this region excellently. There is a small quantity of timber, a good rainfall; there has never been a failure of small grains, and spring wheat is almost a certain crop in the twelve years I have known this country. The winters are severe, but easily provided against. Westward from this point we see precisely the same condition of the soil, dryness of the atmosphere, insufficient rainfall, and general aridity noticed on the same meridian in Kansas, Indian Territory, and Texas. The Platte has a narrow valley, which can be irrigated at considerable cost, and good grazing is always found near the streams. In Wyoming there is some fine grazing along Lodge-pole and other creeks, and some meagre strips that can be cultivated, and nearly the whole surface of the country affords some little grass. During all this progress from Omaha we have steadily ascended, and some sixty miles west of Cheyenne we reach

Sherman, the summit of the Rocky Mountains. From here we have a broken, barren, mountainous country until we get into Northern Utah. The quantity of agricultural lands in Wyoming is too inconsiderable and too little known to admit of any reliable computation, but it is proportionately less than in Colorado, while Nebraska corresponds with Kansas in this, that while the eastern half is very valuable, the western half is worthless.

Going over the Wahsatch Mountains, we find that the range differs but slightly from what it was where we crossed it in the more southerly part of the Territory. The same strip of Mormon settlements at the western foot, and the same desolate country, save that, until we reach the Sierra, the ranges of mountains in the west are less broken; and from there on to the sea the only difference from California, farther south, is that we do not find the broad valley of the Sacramento, but the entire breadth of the State is taken up with irregular mountains running east and west, as well as north and south. While there are no broad valleys, there are several well-watered narrow ones, and the mountains are well timbered. Many of these valleys have been graded by water as well as if done by an engineer, and are of wonderful richness and beauty, always jutting against the adjoining hills, which afford scant pasturage, but abundant timber. There is a plentiful rainfall here, and nothing could be more picturesque than the northern portion of California. It is in the States and Territories along the western portion of this line that we find the great lava flow, extending over two hundred thousand square miles. Much of this is not yet covered with mould or vegetation. Sometimes it is in vast masses of rocks, and sometimes in broken fragments.

We will now notice briefly the northernmost route along the 45th and 46th parallels, or, generally, the parallel of St. Paul, bisecting Dakota and Montana, passing through the southern portion of Idaho, Northern Oregon, and Southern Washington Territory. Starting westward from Duluth, for the first hundred miles there is no prairie, but some meadows of wild rice and high grass, a large preponderance of flat tamarack marsh, and lakes, with very little good timber.

The remainder of the distance to the Mississippi, about sixty miles, is a barren lake district, but with good timber. Crossing the Mississippi, we find pretty good land well timbered with pine, till we reach the valley of the Red River of the North, and pass into Dakota. The whole valley or drainings of this river, a hundred miles across, and reaching near the branches of the Cheyenne River (meridian of 98°), is an excellent wheat and vegetable country, scantily timbered, but by some thought to be too level for drainage. Going west from this to James River, there is some fair land, but much that is waste, and thence to the Missouri, between the 100th and 101st meridians, little or no available land, except the narrow valleys of the small streams.

The Missouri itself, after passing a few miles above Yankton, may be said to have no available bottom-land; for although there are places where the old river-beds spread out and form fine "intervals," or bottom-lands, for one or two miles back from the stream and several in length, yet for the greater part of its course from Fort Benton the river cuts sharply against abrupt, barren bluffs on one or both sides. Whenever this is not the case, the banks are fringed with cottonwood of inferior quality, which sometimes thickens into groves of moderate size. As we go west from the Missouri, we pass through what is known as the "Bad Lands," or *Mauvaises Terres*. This is a broad section of country, either side the river, extending far to the west, with a superposing layer of drift, originally several hundred feet thick, but now broken up into bluffs or small hillocks by the action of the elements, and with but little vegetation. The sides and sometimes the tops of the bluffs are entirely bare of vegetation, and every rain or wind storm carries down vast quantities of mud or dust to the lower levels, much of which finally finds its way into the Missouri. It is a visible example of the levelling process of nature, but it has nothing to do with the rainfall of the country, and the district is superior as a grazing country to one half of that lying between the 100th meridian and the Sierra Nevadas. This continues to be the character of the soil until we get through Dakota and well into Montana. The eastern boundary of Dakota is some two degrees farther west than that of the Indian Territory and Kansas,

and we find a correspondingly narrower strip of good land. After going one hundred miles into the interior, we cross the 98th meridian, and already see a large amount of waste land, which increases until finally, in the vicinity of the 100th meridian, only a few valleys are available. All through the western portion of this Territory are small strips, like the narrow valleys of Apple Creek and Hart River, which can be cultivated, and a few points, like Fort Berthold, with quite extensive flats, where, by planting early and in favorable seasons, cultivation is exceedingly successful without irrigation, yet irrigation is often needed here. But with these exceptions, and the narrow fertile strip in the east, the proportion of cultivable land does not exceed one acre in a hundred. Good gardens at the various military posts in this section are made without irrigation, in the exceptionally rainy seasons (maturing, however, only the early vegetables), unless eaten up by insects and grasshoppers, which occurs about every other good season. There is limited grazing all over the Territory, and in the southwest corner are situated the Black Hills. Elsewhere, with the exception of strips of cottonwood along the streams, there is virtually no timber.

We now go into Montana, and soon reach the Yellowstone, the valley of which, as generally understood, is a myth. It has a rapid current of clear water, which comes down from the snows of the Big Horn and other mountains. It impinges against bluff banks on one side, while it usually has a valley from a half-mile to a couple of miles on the other, and in one or two places, I am told, even to ten or fifteen miles. The portion near the river is covered with excellent grass and the best of cottonwood timber, while that near the bluffs bears an abundant crop of wild sage. The very numerous branches of this stream, commencing with Powder River, which comes down from the Big Horn Mountains, have valleys of varying breadth and availability, and those farther west, beginning with the Big Horn, are clear mountain streams of great beauty. The last-named stream has a beautiful well-grassed valley all the way from the mountains to its mouth, about sixty miles; and those streams west of it, although smaller and with narrower valleys, are, in other respects, similar to it. There is

also a rich grassy strip all along the north foot of the Big Horn Mountains. Crossing the Yellowstone going west we soon reach the Mussel Shell, a muddy, whitish-looking stream, with a broken sterile country on both sides. We shortly after reach the many small, clear, and pebbly mountain streams that go to make up the Judith. The country here is well covered with grass, which in rainy seasons grows rank and high like a continuous meadow, is picturesque beyond description, and the mountains bear scattering pine-trees. From here to the Missouri, where it runs north, is a most broken, mountainous country, tormented with broad and almost bottomless ravines and gorges, with immense, high, and sometimes almost isolated, peaks of barren rocks, marshy flats, white with incrustations of various salts, and great ranges of mountains. All the way through Montana we find great sloping hillsides and table-lands, covered with thin grass; high ranges of mountains, always fringed with timber; many streams with beautiful valleys, water-washed and as level as a billiard-table; innumerable brooks; and a few mountain valleys of some value for agriculture. The minor streams with rich valleys are the Gallatin, Jefferson, Madison, and Sun Rivers, and several more which run west into the Columbia. They have valleys from half a mile to three miles in width, are very rich, level as a floor, easily irrigated, and have been settled for several years. There cannot be far from a million acres of this fine land in Montana, giving, according to the usual rate of our farming States thus far, a population of fifty thousand. In the western part of Montana and Northern Idaho there is a good deal of timber, and a sufficient rainfall to produce crops without irrigation.

Rapidly crossing into Oregon and Washington along the Columbia, we look in vain for the "broad, rich valley" of that river, discovered by the early explorers; unless they mean the half-barren Spakane Plains in the north part of Washington Territory. This stream washes the foot of a mountain, or runs through a gorge that sometimes widens into a valley; and whenever its banks can be traversed by wagons, the wheels cut into a loose arid sand, with here and there a sage-bush so large as to have grown into a shrub with a stalk

several inches in diameter, and extending its branches over several yards of ground. We find these general features of a broken mountainous country till we cross the Sierra, and then we have a most humid atmosphere, abundant rainfall, immense growth of pine timber, and rich valleys on to the sea. In the northwest portion of Washington is situated a network of straits, commonly known as Olympia Bay and Puget Sound, whose outlet is the Straits of Fuca. This unrivalled body of water, which may be considered entire, embraces not less than a thousand islands of various sizes covered with evergreens and other beautiful foliage. The surrounding country has great richness of soil, is thickly wooded, and is favored by a spring season at least six weeks earlier than that of New York, a temperature modified by the currents of the sea, and a mild summer. In plain sight are snow-capped ranges of mountains, an active volcano, Mount Baker, and the great white peaks of Hood, Adams, and Ranier, which combine to make it one of the most beautiful and attractive regions in the world, and the cause of continual rhapsodies on the part of travellers.

We have now passed hurriedly across the section of country in question, virtually upon the five routes talked of as national lines of communication. The portion east of the Rocky Mountains, and a large part of that west, has been described from personal observation extending through fourteen years of military service on the Plains. It is all supplemented by observations and reports of others extending over a period of forty-eight years, including official reconnoissances and the results of vast numbers of accurate instrumental measurements. For its general accuracy I refer, without permission, however, to General A. A. Humphreys, Chief of the Engineer Corps of the Army, to General G. K. Warren and General William F. Reynolds, also of the Engineer Corps, United States Army, who for many years made reconnoissances of the Upper Missouri country, and have given us our only reliable maps of it; to Lieutenant Wheeler, also of the Engineer Corps, now investigating that country; to Clarence King, Mr. Gardner, Professor Hayden, Brigham Young, or to any officer of the army, or other disinterested persons, whose opportunity for observation, and whose practical knowledge in such matters,

will give their opinions value. There are, of course, in so summary an account, many fine sections of limited extent which could not be noticed in a sketch which undertakes to give only general characteristics.

It remains to give, in as few words as possible, the rainfall of this section as determined by accurate daily observations of the area, and extending through a period of more than twenty years. It can be seen by any one in the office of the Surgeon-General of the army. As a standard of comparison, the usual average rainfall in the productive States, east of the general line from which I have proceeded, is assumed as about forty-five inches. It rises to sixty in South Florida, the mouth of the Mississippi, and the west coast of North California, Oregon, and Washington; at Sitka it reaches ninety inches; while in Wisconsin and Michigan, where we have such devastating fires, it is but thirty inches; but the general useful and necessary rainfall is from thirty-five to fifty inches, except at some points on the sea-coast, where it is only from twenty to thirty inches, the necessary moisture there being made up by the excessive humidity of the atmosphere, which imperceptibly precipitates moisture.

Along the 98th meridian the rainfall is from twenty-five to thirty inches, and on the 100th meridian it is from twenty to twenty-five inches; as we near the mountains, from ten to fifteen inches, and even higher on the more elevated tablelands. Westward, along the extreme southern route, after leaving the 100th meridian, there is a rainfall ranging from twenty inches, in Middle Texas, to three inches at Fort Yuma, while its average is ten inches. The generally similar rainfall along the middle portion of this route arises from the Rocky Mountain range breaking down to an almost uniform level with the adjoining country in Southern New Mexico, and on no other route does this occur. The zones of uniform rains range from north to south, varying, for the main part, in the mountainous regions, with the altitude. The great altitude of the Rocky Mountain range increases the rainfall largely; much of it falls as snow, which, melting in the spring, produces what is known as the "June rises" in the streams which flow from those mountains. The

range is from twenty to thirty inches, with an average of about twenty-five inches. The great basin between the Rocky and Sierra Mountains is the most arid portion of our domain, the range being from three to ten inches, averaging but six inches. Blodget says of this basin: "This great arid region may be said to embrace ten degrees of longitude and seventeen of latitude in the United States (the whole length of the country in that region from north to south and high into British America, and between the Rocky and Sierra Nevada Mountains), drained only by the Great Colorado and Columbia Rivers. So arid is the Great Basin, that fully two hundred thousand square miles has not a sufficient rainfall to require any drainage at all." As we ascend the Sierra the rainfall increases rapidly, reaching sixty inches at the summit in Washington and Oregon; nor does it decrease as we continue toward the sea, but only as we go south, until at San Francisco it is only twenty-two inches, fifteen inches at Los Angeles, ten inches at San Diego, and three at Yuma. The effect of this small amount of rain in the interior is to preclude all possibility of general successful agriculture, although in California, by sowing grains early, so as to get the advantage of the rains, which all fall in the spring, a much less rainfall produces good crops. The stunted vegetation that finds life elsewhere has adapted itself to the conditions there found, and much of the season it is dry and crisp, the "*siempre vivre*" being a marked example. In digging up the soil, after only a few inches, we find it perfectly dry and dusty, and this too even in the rainiest season. All this applies also to most of the country between the Rocky Mountains and the 100th meridian. Blodget says in 1855 (in the absence of full data, which have since been supplied) of this region along the Upper Missouri: "One striking remark is always made of it: it is uncultivable, on account of the absence of summer rains. . . . The fact is well established that, as we leave the mountain region, passing eastward, the rainfall becomes greater. . . . The atmosphere is so arid that there can be but slight winter precipitation. The rains that fall, for a like reason, do not afford the advantage they otherwise would, they are so soon evaporated." He also says, page 747: "On the Upper

Missouri there is known to be a great deficiency of rain in the summer months at times, and a large part of the great area partially enclosed in its long curve is set down as arid and uncultivable by explorers. Its amount of drainage is too small to permit a supposition that it is otherwise, as all its tributaries, except the Yellowstone, are small and unimportant streams." The latter receives its waters largely from the mountains, but in summer they all discharge very little water. The very popular theory that the rainfall is increasing in that country, and that it is due to the effects of civilization, is not supported by accurate measurements. The natural laws that govern these phenomena are too broad and general to be affected by the slight results of civilization already found there. The wish is father to the thought. All over this vast territory, wherever beds of primitive rocks are found, are natural tanks where the rains collect and the water may remain sweet the whole year. In nearly all this section there are also found springs of water, but in some portions very infrequently. Wherever there are high mountains the rains and snows of winter form a great number of streams of pure water; but in many large sections, more especially in the great basin west of the Rocky Mountains, the water both of springs and streams is frequently salt and unfit for use. Wherever pure water can be found for irrigation, even in the most arid and unpromising soil, the most abundant crops can be raised. The amount of water, however, available for this purpose is exceedingly limited, and the popular belief on this point is erroneous. The level spaces along the margins of streams or at the foot of mountains are very narrow, and nowhere else can the water be used cheaply. It would require very great outlay to utilize the large rivers, on account of the great fluctuations between high and low water. The success of artesian wells is not promising. The government, and private enterprises, have already expended much time and money in these projects, without much success, and at too great cost for farming purposes.

There are several small sections of country where, from special causes, agriculture has been made successful. In New Mexico for the last two hundred years the old Spanish population has carried on in its own un-American way its peculiar style of

farming, — ploughing the ground with the fork of a tree, and artificially irrigating their crops as the Egyptians did thousands of years ago. A few Americans also, with the certainty of selling their crops at a high price at the military posts, have successfully embarked in this style of farming. In Colorado these experiments are going on with considerable success, being limited by the amount of water available, and the amount of capital that can be raised to secure it. The garden and tree culture about Denver is very successful, and Greeley, some forty miles north of it, is the best example of combined effort in this direction that has come to my notice, but by too great an outlay of capital to be copied. The success of the Mormons in Utah is remarkable, and has been brought about by special causes, — religious fanaticism, a mild but forcible despotism, the industrious habits brought from Northern Europe, and the spur of a lucrative market, produced first by the emigration of 1849, then by military occupancy, and most of all by the discovery of the precious metals in the adjoining Territories. All these have tended to bring about this remarkable state of things. They have settled along the immediate western foot of the Wahsatch Mountains, beginning in Idaho and extending southward for six hundred miles into Arizona. As yet there has been but little combined effort in constructing water-ditches there, nor has it been necessary, for the mountains furnish a great number of small rivulets made applicable to each farm. Yet with all this stretch of cultivated country, the Hon. Mr. Hooper, who has so long represented the Territory in Congress, told me, that if all the available land in the entire Territory could be placed consecutively in one long strip along the whole distance, it would be but a very few miles in breadth, and that it is even now necessary to soak out the alkali, a very slow process, before the land can be used. My own observations quite confirm this statement, giving therefore slightly over a hundredth of the area as arable. The successful farming about Bazeman and some other parts of Montana make up, with the cases already cited, the principal examples of successful agriculture in this great interior country, and will probably be all-sufficient for the wants of that country. Tree culture has been very successful at Denver and other parts of

Colorado, in New Mexico, and at Salt Lake City, in Montana and Nevada too ; but not one tree have I known to thrive, unless there was, at its roots, an irrigating ditch with running water. When the water ceases the trees die. All over this interior country trees can be raised successfully when artificially watered, and in no other way, except on the borders of streams where nature has already placed them.

The grazing facilities of this entire country cannot fail, in the aggregate, to become exceedingly valuable. There is much diversity of opinion as to its extent, but it must be very great. But farms for grazing purposes, as we know them in the States, will never be found here. Wherever there is unfailing water there will be an owner of it, who will control the range about it, either by cession or legal assignment, and the next water may be thirty miles away. Many acres will be required to furnish the grass grown on one acre in Ohio or Illinois. Nor will there be successful stock-raising here, in any of the Territories, till people come with capital to build shelter and to provide all the protection and food for stock, as is done in the Eastern States. The following extract shows what now exists in Nevada, which will and does take place every few winters in all the Territories ; and until there is proper provision made for such seasons, stock-raising in the Territories will be a snare and a deception. Experience has shown most conclusively that good stock requires the same care and provision in all these Territories that it does in Ohio and New England ; and wherever too great reliance is placed on unassisted nature to furnish this food, we find a compensating decrease in the quality of the animal, as is shown in some portions of the Southern States and in Texas.

“HARD TIMES IN NEVADA.

“The Reno (Nevada) *Journal* says that after a long, dreary winter, spring has at last opened, and as the snow recedes from the valleys, the farmers are all busy putting in their crops. The past winter has been one of the hardest ever experienced in the country. Many have lost all the live stock they possessed, and all have lost a large per cent of their stock. Honey Lake Valley has probably suffered most ; the hay-crop having been short the past year, nearly every one was obliged to buy, and consequently the few men who

had any raised the price, demanding whatever they wished. Hay has been sold in Honey Lake for \$60 a ton, and in Susanville it commanded at one time \$130 per ton. Yet stock are still dying, and a person riding through Honey Lake Valley can hardly get out of sight of dead and dying cattle. Sheep have fared better than cattle; but at present they, too, are dying very fast from the effects of the alkali which they got into their stomachs while eating the short grass which is just sprouting."

My post of duty, the past season, has been at Fort Buford, on the Missouri, at the mouth of the Yellowstone, a point supposed to be exceptionally good. I have before me a letter from the hay-contractor, Mr. Joseph Anderson of St. Paul, in which he informs me that this season, in order to gather nine hundred tons of hay for my post, he has been compelled to search over a country extending twenty-five miles in all directions on the north side of the Missouri River. There was no grass to make hay for as great a distance beyond, making about twelve hundred square miles. I have not noticed the high temperature of this section; for, although the heat of summer is intense in some portions, yet that of itself would not prevent the country from becoming populous. It is proper to speak of the extreme cold of this northern route, not because it is an insuperable obstacle to the populating of the country, but to expose the fraud practised in representing it as desirable. The many excessive changes in temperature, sometimes seventy degrees in twelve hours, are exceedingly trying to all persons with rheumatic or scrofulous tendencies. This post is situated in the midst of the "northern tropical belt" we have heard so much of, — a belt not clearly defined, but supposed to be synonymous with what has been called on the large maps distributed by the Northern Pacific Railroad Company (now before me) as "The Continental Wheat Garden" extending to the Saskatchewan country on the 53d parallel. It has been claimed by the company as one of its great purposes to open this country. It is, in a direct line, two hundred and fifty miles from Bismarck; but the proposed line of the railroad, in passing west, makes so small an angle with the river after crossing it, as to be but one degree south when opposite Fort Buford; and whatever is said of the tem-

perature or rainfall at that post is practically true along the line of the railroad. By examining the isothermal lines of Blodget, it will be seen that the summer, winter, and annual isothermal lines, passing very near Fort Buford, toward the east, deflect southward, crossing the railroad from ten to forty miles east of Bismarck, and remaining south of the road as they pass eastward until beyond its eastern terminus. The Northern Pacific Railroad Company has published and widely distributed, on a large map, what purports to be the correct averages (isothermal lines) of the summer heat of this region. As compared with Blodget's Charts, published by the government, they have forced these lines three degrees to the north. Thus the summer line of 70° Fahrenheit, passing through this post, latitude 48° N. by Blodget, will be found on their maps on this meridian at 51° . They also avoid allusion to the summer extremes, 104° Fah. in the shade, and frosts nearly every month, and entirely suppress the spring, autumn, and winter isothermals. The result is that any one not entirely familiar with these subjects is deceived by these maps, thinking that the lines represent the annual temperature, but called summer, seeing no others, from their warmth, while the real spring, autumn, and winter temperatures, corresponding to a summer temperature of 70° in this region, are 32° , 44° , and 15° respectively, with a mean annual temperature of 45° . (See Blodget's Charts.) Our own records for the past eight years confirm these figures, while we have forty days with the thermometer below zero, and the coldest days at -37° to -40° . It is believed that these maps have been prepared purposely to deceive.

The storms of winter in this region are truly terrific, and it would seem that they must destroy all animal life not securely protected. The Indians never buffet them, but on the approach of one, if travelling, they at once go into camp in some sheltered place, and remain until the storm is over. This is told me by the oldest and most reliable mountain-men of the country, and is confirmed by the large number of deaths occurring in these storms every winter. All remember the storm in Minnesota in the winter of 1872-73, in which hundreds lost their lives, the storm about Yankton the same spring, and the

storm in which so many of Colonel Cole's cavalry horses were frozen to death at the picket-line in the Powder River country in 1865. These are examples liable to occur any winter. I am informed that the climate is more mild in Montana, but I have not seen accurate reports from there. As we go towards the Pacific, the climate perceptibly moderates, from the influence of the ocean.

The foregoing imperfect description has been presented with the one purpose of calling the attention of the people of the country to the most important fact that we are rapidly approaching the limit of time when the landless and homeless can acquire both lands and homes by merely settling on them. We have reached the border all along, from Dakota to Texas, where land for nothing is no cheaper than good land at thirty dollars an acre. Not but that there is yet a great deal of good land for pre-emption in all the extreme frontier States; yet in all these States some settlements have reached the border, and from the 100th meridian to the Sierra Nevada Mountains, a distance of twelve hundred miles, there is not more than one acre to the hundred that has any appreciable value for agricultural purposes, or that will for the next hundred years sell for any appreciable sum. Moreover, for one hundred miles before reaching that meridian there is comparatively little good land. The authorities for this statement are believed to be unimpeachable. My personal observations have been of the strictest character, accompanied by careful statistical study. I have served in every State and Territory on both the eastern and western frontier, excepting Arizona and Alaska, and in all of these I have seen the land tried in gardens and in fields. There is no fault of soil anywhere. The fault is in the want of water. It is possible that, at some remote period, the good lands of the country may be so densely populated as to cause many to seek a precarious existence by such meagre farming as is possible in this region; but until then, the occasional great stock-grower, the scattered groups of miners, and the fortunate farmer, or groups of them, in the narrow valleys, who can control a little water for irrigation, will comprise the population. As an example of such populations we have Nevada, where about all its capacity in this direc-

tion is utilized. It has been represented in Congress, by its two senators, for ten years, and it has a population of about forty thousand, or about one third as many as a single congressional district in the populous States. And New Mexico, which for twenty years has been in our full occupation, is another example. It costs many million dollars for its administration; yet take away the army, its hangers-on, and the transient miners, and the remaining American population could sit in the shade of a good-sized apple-tree.

There is yet a good deal of unoccupied land in Northern Texas, but it is owned by the State, and is fast passing into the hands of railroad corporations. The lands of the Indian Territory are owned by the Indians themselves, not as a reservation set aside for their use, but as compensation for their having surrendered valuable considerations, in farms and other lands, to the United States, and they hold patents for them from the Land Office. If there is any one pledge of the government more sacred than another, it is that these people may have a perpetual home there.

The phenomenon of the formation and rapid growth of new, rich, and populous States will no more be seen in our present domain, and we must soon face a condition of facts utterly new in the economy of the country, when, not new, but old States must make room for the increase of population, and thereby receive a fresh impetus. And the old song of "Uncle Sam is rich enough to give us all a farm" will no longer be true, unless we take farms incapable of cultivation. I am aware this will startle very many people. There has been a system of misrepresentation practised about the value of this country, which cannot be estimated without considering the extent of the interest involved in such misrepresentation.

The government has, year after year, at great expense, sent parties of scientific men to traverse these countries; to gather up, describe, and publish all that could be found out relative to beasts, birds, insects, fishes, and every conceivable creeping, crawling, or flying creature; also correct reports of its geology. But I have never known any one charged to learn and report that most important of all items, "whether it is good for agriculture." And the Surveyor-General is to-day

surveying, at great expense, large strips of country in some of the Territories which will never be sold by the acre.

It has been common to make up excursion parties of newspaper-men, members of the government, and citizens of large influence (always in the green months of May and June), to visit these sections. The roads all lie along the valleys of streams, and at that season give the idea of fruitfulness. These persons are never taken on transverse routes, where they would invariably find sterility, nor are they practical agriculturists. After an excursion of this kind, where every human want is anticipated, the press would be unnatural not to applaud, and the members of the government mean not to encourage, the enterprise. An obligation has been laid upon them all, and they have only seen the country at its best points and in its holiday dress. Men in high places have been employed, and paid for their services, in writing and speaking for these enterprises, and their writings and speeches used as advertisements in disseminating this deception. Their names are synonymes of honor and truth, but they, too, are deceived, and are made to deceive others innocently. For illustration, we will take the example of the North Pacific Railroad. This road, having no resources but its land grant, must make that appear valuable, to enable it to secure the means necessary to build it. By taking these eminent persons, above mentioned, to the rich wheat-growing lands of Minnesota, to the valley of the Red River of the North, or to Corinne on the Union Pacific Railroad, and thence along that most enchanting of all journeys, at the western foot of the Rocky Mountains, and the rich valleys of Montana, or to the most beautiful of lands, the country of Puget's Sound, they are so impressed with these fruitful points as to honestly believe that it is all fruitful; and in just enthusiasm they write an account of what they have truly seen, as being equally true of the whole. This is the route Herr Hans was taken. Many of the advertisements so lavishly printed in all the press contain more or less positive falsehoods. The most flagrant I have seen is "that this grant, for its entire length (meaning, in general acceptation, all of it), is capable of producing all the cereals and fruits of the Atlantic States." Another, more indirect, is by instancing the success

of sales of land-subsidies in good sections of the country, for instance the Illinois Central, as illustrations of what may be expected from the whole route. By issuing a series of misrepresentations of the climate on a part of their route; by causing the press to publish, as editorials or current news, the statements of the company; by producing attractive displays of vegetable products at fairs, grown no one knows where, certainly in none of the country mentioned as bad in this article; by a specious literature, as magazine articles, so artfully written as to hide their intent; by engaging the religious press and church influence of the country, — they have succeeded, to a large extent, in deceiving the people. Another powerful advertisement which this road has employed with marked success is by securing from the government costly expeditions as escorts, to be known and written about as acting in the interests of this road. They have been readily furnished, which shows to the world a fostering interest next akin to actual government indorsement.

As a single example of the advertisements used in these interests, take the following from the *Nation* of August 22, 1872: —

“PROGRESS OF THE NORTHERN PACIFIC RAILROAD. — The entire aspect of the far Northwest is undergoing a rapid change, in consequence of the construction of the Northern Pacific Railroad. . . . Long trains of emigrants follow the track of the railroad surveyors and builders, so that the country is being thoroughly explored, and is filling up with a rapidity which is destined to increase into the largest population.”

This statement is entirely false, after passing west from the valley of Red River, where the surveyors and builders then were, nor is that country susceptible of cultivation. The emigration stopped short at the line of the Red River. “Operations are now centred in Montana, where track-laying progresses at the rate of three miles a day.” To refute this statement it is only necessary to say, track-laying has in no place on the Northern Pacific Railroad reached nearer to any point in Montana than two hundred and fifty miles. Another equally untrue statement is, “the trunk road is now in progress of construction along the Yellowstone River in Montana.”

No construction party ever reached within two hundred and fifty miles from any point on that river.

"The observations, so far, amply confirm all that has been said of the fertility of that country along the line of the railroad. In Dakota the climate is genial, and the soil is admirably adapted to the cultivation of grain. . . . Natural water-springs can be found almost anywhere by excavations ten or twelve feet beneath the surface. . . . Of the soil fully nine tenths is arable land."

It would be difficult to invent so many falsehoods in so few words. The country, with the exceptions hitherto mentioned, is practically worthless. The winter climate is given elsewhere. Natural water-springs are often a day's march apart, and to get water at Fort Buford wells have to be sunk sixty feet to the level of the Missouri, and rise and fall with that river. Farther back from the river they would have to be sunk much deeper.

"The company is fairly entitled to the merit of amicably settling for the United States government, at once and forever, the Indian question on the most difficult and threatening portion of the frontier."

It is well known that construction on this road has never reached the hostile Sioux country, and that whenever surveying parties have gone there, they have been escorted by several regiments of troops.

The audacity of the last quotation, and the boldness of misstatement in all of them, require no comment. These advertisements, asking and advising the people who have safely invested their savings in government securities to exchange them for the securities of these roads, with the promise of a higher rate of interest, have induced thousands of the poor and needy of the country, who have put by the little earnings of a lifetime in safe securities, and those holding funds in trust, to exchange them for these bonds, having a present security of land at two dollars an acre that has no available value. If these roads ought to be built, can there be any sufficient reason why they should be built upon a basis of deception and fraud? But is there any sufficient reason for building five lines of road across the continent, at a gross cost of five hundred mil-

lions of dollars, every cent of which must be borrowed ; the final return of which must depend upon the value of these lands. The three great reasons urged for building these roads are : First, military or state considerations. These seem sufficient to warrant the construction of one road, which for many reasons should better have been built along the 32d parallel, as it probably would have been had the South been represented in Congress. And, even now, since the Union Pacific is liable to be closed any winter, and is certain to be closed some winters, as was the case for many weeks in 1871-72, it seems suitable at once to build a southern line. But let it be built on a true basis, and not on one of falsehood. The second reason is, to develop the great interior country into rich and populous States. This I deem fallacious, for the country is incapable of it. Look along the lines of road already built ; where there were begun thriving towns, with their plats and choice corner-lots, there is not now one shanty left. Many have seen, and nearly all remember, such rattling, noisy towns as Phil Sheridan, on the Kansas Pacific Railroad, not far from the 100th meridian. There is not to-day a stake, brick, or shingle to mark the ground where it stood, and this is true of many others. Were this development possible, the advisability of scattering, across great stretches of new country, poor and destitute colonists (as nearly all are who settle new countries), without the aid and co-operation of established neighborhoods, may well be questioned. Successive settlements furnish these. I saw much of this dreadful suffering and almost starvation along the Republican and Solomon Rivers in 1871-72 in Kansas, where these poor people had been induced to come by the Kansas Pacific Railroad, entirely beyond schools, and where it took the earnings of a season to secure the attendance of a doctor. Colonization is not increased by scattering it. The other reason given is the great value of the international carrying trade. When it is remembered that a bushel of wheat can be carried from San Francisco to Liverpool in ships — nature supplying in this case both roadway and motive-power — as cheaply as from Chicago to New York by rail, and that the proportion of costs in these cases is as one to thirteen per mile, and when time and insurance are

the only other elements to be considered, any one may readily calculate the extent to which a railway three thousand miles long can successfully compete for any considerable amount of this trade.

The foregoing article was written some two years since. In the interval much has been said and published which requires comment or reply. Without entering into the region of controversy, a few further remarks may be thought becoming.

The rainfall of this region, which is its controlling characteristic, varies greatly with different years. For the past eight seasons it has been determined by accurate measurement as follows, namely : —

Extract from the Public Records.

Years.	Annual.	In summer months. May, June, July, and August.	Remarks.
In 1867	6.58 inches	5.17 inches	This includes the melted snow of winter.
" 1868	11.50 "	9.36 "	
" 1869	9.74 "	5.23 "	
" 1870	9.19 "	6.25 "	
" 1871	9.42 "	3.98 "	
" 1872	19.99 "	6.77 "	
" 1873	21.11 "	10.73 "	
" 1874	6.50 "	4.49 "	To Aug. 11.

I hereby certify that the foregoing is a true extract from the public records of the post.

J. F. MUNSON,

1st Lieut. and Adjutant, 6th Post Adjutant, Fort Buford.

The rainfall for the four growing summer months is also given in the foregoing table. It will be seen that that for 1872 and 1873 was greatly in excess of the others; particularly the summer rains of the second of these years. The result has been an extraordinary growth of vegetation such as has seldom been seen here. This was especially true in the year 1873.

Writers have been employed to describe the country that year, and have well improved their opportunity, honestly believing, no doubt, that it was but an ordinary season. The two most conspicuous examples are a series of letters written, as is supposed, under the pay of the Northern Pacific

Railroad Company, by the best letter-writer of the press, and another, written by General George A. Custer, and published in the company's leading Western organ just before the bill for the relief of the road was presented to Congress. The descriptive portions of these letters are, without doubt, accurate. These writers, however, have committed the error so commonly and innocently committed by thousands who undertake to enlighten mankind. They have substituted an example for a general principle. They both pursued the idea that other seasons had been, and would be, like the one they described. In this was their error, since they wrote of the most exceptionally fruitful year on record. The present season alone offsets all they have both said. There has been very little rain during the three summer months of this season; the country is, in consequence, parched and brown, the grasses having grown but one or two inches, where they grew from one to two feet last year. So little water is there, that in coming from the James River to Fort Buford, *via* Bismarck, along the north bank of the Missouri River, a distance of three hundred and twenty-five miles, I have crossed only four running streams, each of which might be spanned at a single step dry-shod. General Custer wrote of this country after serving in it but one summer; Mr. Townsend, after remaining in it about one week. The following letter from General Sully tells its own story:—

FORT VANCOUVER, WASHINGTON TERRITORY,
June 18, 1874.

DEAR GENERAL: In answer to your questions about my opinion as to the climate, character of the soil, etc., of the section of country through which the North Pacific Railroad passes, I would state as follows. My experience of that country dates back as far as 1854, when I was stationed in what was then the Territory of Minnesota, near what is now the western portion of the State. From that time till 1859, when I marched across the country to the Platte River, I was on duty in different sections of the country between the Missouri River and Minnesota, and on the Upper Missouri. From the fall of 1863 to 1866 I was in command of troops operating against the Sioux nation, who were then in a state of war both on the east and west of the Missouri River, as far west as the Yellowstone River, and north to the British possessions. In 1867 I was

again sent into that country to visit the different bands of Sioux, and went up the Missouri as far as the mouth of the Yellowstone. In 1869 and 1870 I was stationed in Montana, and visited the Yellowstone Valley, and the head-waters of the Columbia, on the west side of the Rocky Mountains, and now I am located in Washington Territory. I have thus had some opportunity of judging of the nature of the country through which the North Pacific Railroad is to pass. The country west of Minnesota, till you reach the Missouri, is decidedly bad : a high, dry, rolling prairie, unfit for cultivation, except in a very few detached places along the very few streams. There are several ponds or small lakes, but very few of them contain water that you can drink, and many of them dry up in summer. There is very little, in fact, you may say no timber, and as a general rule very little rain falls during the summer. The country might do for grazing, but cattle would be obliged to roam over large sections, and in winter would perish for want of timber, or other means of protection against the climate, which is very severe : heavy snows and heavy winds, and very cold. . The country west of the Missouri to the Yellowstone is much better in every respect, — more arable land, more timber, more drinkable water, and I found on my trip across it many large deposits of coal or lignite. Still, I would not recommend it as a good country to settle in, and large portions of it can never be inhabited, — not even by Indians. As regards the climate, it is about the same as in the country east of the Missouri. I saw by General Stanley's report of his expedition with the railroad company through that section, he had considerable difficulty with high water in the streams. I found no such difficulty when I crossed through that country. The season, however, was very dry, and I forded both the Yellowstone and the Missouri just above the mouth of the Yellowstone, with my command, — some two thousand cavalry. This was in September. . . . Yours with respect,

(Signed)

ALF. SULLY,
Colonel 21st Infantry.

TO GENERAL W. B. HAZEN, *U. S. Army.*

General Sully also speaks highly of the valleys of Montana and of the Pacific coast, and especially of the timber. The climate he says is "far better than east of Montana."

The drought he encountered was only that of ordinary seasons here, differing widely from the anomalous seasons of 1872 and 1873, which have done so much to deceive the hopeful people all along the border, and to encourage settlements

that must be abandoned. The eight seasons the rainfall of which I have tabulated give but three years of like rainy character, in summers 1868, 1872, and 1873. In the other five the rainfall was less than ten inches annually. On the 3d of August I left Fargo, about 97° long. west, on the Red River of the North, by the Northern Pacific Railroad, for Fort Buford. The boast there was that they had been favored by rains every few days all summer, and the evidence of the fact was clear enough from the rank condition of vegetation. The grasshopper scourge I had read of was not visible. This condition marked the country in going west for about seventy-five miles, when the grasses appeared shorter and the diminishing rains began to be apparent. This continued until we arrived at James River, near the 99th meridian, where the earth and vegetation showed unmistakable signs of excessive drought. Going westward forty miles farther to Crystal Springs, we found a garden-spot of some four acres ploughed, about one half being in a little valley, the other running up a slight bluff. The valley was devoted to ordinary garden vegetables, while the side-hill and bluff had been planted to corn. The vegetables gave promise of a tenth of a crop, while the corn, although showing itself at the foot of the hill, faded out of sight before the eye got half-way to the top. Going still westward to Bismarck, near meridian 101°, the drought had consumed nearly everything. Apple Creek stood a stagnant pool, the grasses in the valley being no higher than on the prairie. About the town the little planted patches were thinly covered in spots with a sickly vegetation, first eaten off by grasshoppers that only saved it from a universal drought. From that point to Fort Buford, two hundred and twenty-five miles, was one unchanging stretch of brown and yellow hills and valleys consumed with drought. With all this we found wood, water, and grass in abundance for our stock; but attempts at gardens at Fort Stevenson, Fort Berthold, and at Fort Buford have failed, as they have done along the whole line of the Upper Missouri. The trees planted at Forts Stevenson and Abraham Lincoln, the two past seasons, and which were growing so boastfully, were about half dead and dying. A few potatoes and a little native Indian corn is all that will be raised. The hay-contractor

at the latter post was expected to forfeit his contract, while it was asserted by intelligent men that the quantity of hay required at the two posts, Lincoln and Rice, five thousand tons, could not be had within fifty miles along the river and twenty-five miles back on both sides. At Fort Buford it has taken all the available grass that could be found within twenty miles in all directions to provide four hundred and fifty tons. Near Bismarck men were cutting the hay for ten miles along the windings of ravines so narrow that one and sometimes two swaths would cut the entire breadth of grass. The contracts made by the government call for "upland hay," but not in a single case will there be any upland hay to be had, and it will be cut of necessity from swales and low land. There is not a farm for this entire distance of three hundred and twenty-five miles, although there are a few patches where farms are intended; no wheat appears to have been sown anywhere on this line. This is but an example, but with that of last year we have the two extremes. This is the proper season of the year to visit the country to see it at its worst, to offset false impressions gained of it by the universal custom of visiting it in the early season.

The system of meteorological measurements was commenced in 1819, under the direction of the Secretary of War, the Hon. John C. Calhoun, and has been kept up and constantly improved ever since, extending over the territory acquired from Mexico, and to the constantly increasing military posts. Blodget says of them, in great justice: "These observations are taken under the direction of officers, by strict rules, and are the best calculated to give the best results." These compiled reports comprise seventeen hundred printed pages, and are derived from more than fifty million instrumental observations. They are taken from all portions of the country, and their entire accuracy, as a mass of correct averages, has never been questioned by any one competent to deal with them. Differences of simultaneous observations at remote points prove nothing, nor are the sensations any guide, as they are dependent upon the winds more than the temperature. The experiences gained in a single season are quite as apt to mislead as to instruct. These tables prove nothing so conclusively as the

great variableness of consecutive seasons, sometimes the rainfall differing as much as twenty inches ; but by taking the averages of any eight seasons in the tables, we get a very close approximation to the true law, as the result does not generally vary more than two inches of rainfall from the entire average. An accurate measurement of the rains at Fort Buford for the past eight years gives an annual fall of twelve and a half inches ; while Blodget, in his tables, all made previous to 1867, gives fifteen inches, — so near as to prove their practical accuracy. These tables also prove conclusively that the laws have been constant during the period of the formation of the tables, and that the theory, so popular, that the rainfall increases with the cultivation of the land, is erroneous. A few changes have been detected, but due to difference of instruments.

These facts seem to establish beyond question an insufficient rainfall for successful agriculture in those regions west of the 100th meridian, and this agrees accurately with the accepted and well-known views of all practical and intelligent men who have a true knowledge of the country, formed upon long experience, and who have no other interest in it than to truthfully represent it. The reasons given by our public men, who know the facts and will not speak out, are probably sufficient to themselves, but will not always bear the strictest tests.

The greater part of this country has places and spots where great labor, a rainy season, or other favorable circumstances may produce encouraging results ; but the farmer, whose margin of profits is small at the best, cannot bear such uncertainty, and whatever influence tends to lead him into these sections faster than he would naturally find his way with his eyes open, from the continuous borders of the settlements, will lead to his disappointment and misery.

The plan of "placing" the lands of the Northern Pacific Railroad "where they would do the most good" was varied by Jay Cooke from the example of his illustrious predecessor in this, that while Oakes Ames undertook to place them directly with congressional representatives, Jay Cooke, more radical and shrewd, endeavored to place his with the people, until enough had been so placed as to assure such interest in

the road as would compel Congress to subsidize it. If this scheme is ever to be meritorious, and able to stand upon its boasted land grant, why is it not so now? It can never have more acres of land to the mile of road than it has at present, nor can it ever again — should construction go on — have so many acres of *good* land to the mile as it has now.

It is eight years since, with twenty-five men, I passed over the Yellowstone country, where it is now proposed to build a railroad, and saw the iniquity of the scheme, so recently discussed, to build a road upon the credulity of the people, impressed with the belief that the country was valuable. Until there shall arise some more palpable reason in its favor than has, as yet, been produced, it is an act of simple duty to record a protest against the plan.

W. B. HAZEN.

ART. II. — *The Native Races of the Pacific States of North America*. By HUBERT HOWE BANCROFT. Vol. I, Wild Tribes.

THAT the present condition and prospects of American literature are not very flattering will hardly be denied. A score or more of years ago there seemed a fair hope that the intellectual development of the country would not be absolutely disproportioned to its material growth; but thus far the hope has not been fulfilled, and, relatively to our vast increase in wealth and population, the value, though not the volume, of literary products is less than before. This proceeds, naturally enough, from several causes. The excitements of the war and the inflation of the currency, with the morbid stimulus it applied to trade and industry, were no doubt strong anti-literary influences; but a violent impulse had been given long before to all kinds of material activity by the discovery of gold in California. Here, more than anywhere else, began that frenzy of speculation and that race for wealth which have created an atmosphere where the scholar and the thinker find it hard to breathe.